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REVIEW

Interventions for sexual problems following treatment for breast cancer: a systematic review

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Abstract Sexual functioning is an important element of quality of life. Many women experience sexual problems as a result of a breast cancer diagnosis and its treatment. Little is known about the availability and the effectiveness of interventions for sexual problems in this patient population. Six electronic databases were searched using Medical Subject Headings and keywords. Additional hand searching of the references of relevant papers was also conducted. The searches were conducted between October 2010 and January 2011. Papers were included if they evaluated interventions for sexual problems caused as a result of breast cancer or its treatment. Studies were only included if sexual functioning was reported using a patient-reported outcome questionnaire. Studies were excluded if sexual functioning was measured but improving sexual problems was not one of the main aims of the intervention. 3514 papers were identified in the initial search. 21 papers were selected for inclusion. Studies were of mixed methodological quality; 15 randomised trials were identified, many included small sample sizes and the use of non-validated questionnaires. Three main types of interventions were identified: Exercise (2), medical (2) and psycho-educational (17). The psycho-educational interventions included skills-based training such as problem-solving and communication skills, counselling, hypnosis, education and specific sex-therapies. Interventions were delivered to individual patients, patients and their partners (couple-based) and groups of patients. The widespread methodological variability hinders the development of a coherent picture about which interventions work for whom. Tentative findings suggest the most effective interventions are couple-based psycho-educational interventions that include an element of sexual therapy. More methodologically strong research is needed before any intervention can be recommended for clinical practice. Improved screening and classification of sexual problems will ensure interventions can be more effectively targeted to suit individual patient needs.

Keywords Breast cancer · Sexual functioning · Sexual problems · Systematic review

Introduction

Sexual functioning is an important element of quality of life (QOL) [30] as changes in sexual functioning may lead to relationship difficulties and emotional problems. Sexual dysfunctions caused by breast cancer diagnosis and treatment have been shown to affect large proportions of women [19]. Although any cancer diagnosis can cause sexual problems, breast cancer is a unique case in that the breast although not directly a sex organ is seen as a symbol of femininity and plays a role in pleasure and stimulation [14]. Most treatments for breast cancer involve surgery to

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remove all or part of the breast. Surgery can impact on a patients' body image which in turn may affect sexual functioning. Women receiving breast conserving surgery or reconstruction report greater satisfaction with sex life compared to women who receive mastectomy [28]. Breast cancer patients also often receive chemotherapy, radiotherapy, hormone therapy or a combination of these treatments. All the treatments have varying impacts on sexual functioning [3, 8, 15, 32, 46].

Sexual problems can be difficult to diagnose. The Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) [2] and the International Classification of Diseases (ICD-10) [47] provide criteria for sexual dysfunction. There are, however, inconsistencies in these classifications making clinical application more challenging [11]. The criteria were adapted to create the following categories of female sexual functioning disorders: sexual desire, sexual arousal, orgasmic and sexual pain [5].

Maintaining sexual activity can be a sign of overall wellbeing and the ability to cope with the illness and treatment [4], therefore, it is important to address this issue routinely in oncology practice. Research suggests that although sexual issues may not be a patient's main concern during treatment, it is still an important issue [15]. Despite evidence highlighting the importance of sexual issues to patients and the extent of problems experienced, these issues are rarely discussed in oncology [33]. Studies exploring healthcare professionals' views about discussing sexual issues have highlighted barriers to discussion. Healthcare professionals often perceive discussion of sexual issues as disrespectful or inappropriate due to the patients' age, gender, religion, culture and socioeconomic status [24]. Time constraints are also a concern. Sexual issues are not given priority in the clinical setting meaning healthcare professionals struggle to make time to discuss these issues [24]. A lack of available resources to manage any identified sexual problems is another possible barrier to discussion [41].

Knowledge of the range of interventions and their effectiveness is essential to ensure patients are provided with necessary support. A systematic review evaluating the use of interventions for sexual dysfunction after cancer identified 11 randomised control trials (RCTs) [31]. Ten of the RCTs were conducted with prostate cancer patients. The review did not highlight any RCTs for breast cancer patients. To date, no systematic review has been published evaluating the effectiveness of interventions designed to treat sexual problems experienced by breast cancer patients. To recommend interventions for clinical practice, there needs to be an evidence base to identify which interventions are most effective in improving sexual problems experienced by breast cancer patients.

Aim

A systematic review to explore the nature and effectiveness of interventions for treatment of sexual problems experienced by breast cancer patients.

Method

Medical subject headings and keywords were used in several databases: Medline (Ovid 1948 to January 2011), Embase Classic and Embase (1947 to January 2011), PsychInfo (1806 to January 2011), AMED (1985 to January 2011), CINAHL (1981 to January 2011), The Cochrane Collaboration Cochrane Review Database. The search terms covered three main areas: Breast cancer, sexual problems and types of interventions. A detailed list of search terms used is listed in the supplementary material. Additional hand searching of references of relevant papers was also conducted. Searches were conducted between October 2010 and January 2011.

Selection

The 2010 Cochrane review [31] did not find any interventions for sexual problems experienced by breast cancer patients, therefore, the search was not just limited to RCTs. Studies were included if they evaluated interventions for sexual problems experienced as a result of breast cancer diagnosis or treatment. Studies were only included if sexual functioning was quantitatively measured using a patient-reported outcome (PRO) questionnaire. Studies using qualitative data are unlikely to include a baseline assessment making it difficult to assess the effectiveness of the intervention. Studies were excluded if sexual functioning was measured but improving sexual problems was not one of the main aims of the intervention.

Data collection and analysis

Papers identified were collated in Endnote and duplicates removed. The titles and abstracts of papers were reviewed. Full text was located for any papers that met selection criteria. A description of the quality grading scale applied is presented in Table 1. This classification system was devised using Cochrane [22] and Revenson [34] criteria for classification of high quality studies.

Results

The search retrieved 3514 papers. Titles and abstracts of papers were reviewed against inclusion criteria by two

Table 1 Study quality grading criteria (Grade 1 indicates the highest quality study)

Quality grading	Criteria
1	RCT with no methodological flaws
2	RCT with methodological flaws (validated questionnaires not used, insufficient sample size)
3	Randomised trial no control with no other methodological flaws
4	Randomised trial no control with methodological flaws (validated questionnaires not used, insufficient sample size)
5	Non-randomised controlled study with no methodological flaws
6	Non-randomised controlled study with methodological flaws (validated questionnaires not used, insufficient sample size)
7	One intervention group no comparison

independent reviewers (ST, LZ). Figure 1 details the flow of papers. 62 papers were selected for full text review, 41 were excluded because participants did not have a diagnosis of breast cancer, sexual problems not measured as an outcome or not reported and descriptive studies. Table 2 describes the main characteristics of the 21 included studies.

Study characteristics

Patient sample

All studies were conducted in countries of predominantly western culture and the majority of studies included patients with early breast cancer (stages 0–3a). The number of participants consented to the trials ranged from 14 to 304. Four studies [10, 13, 18, 35] screened patients prior to study entry for the presence of specific symptoms such as hot flushes or sexual problems.

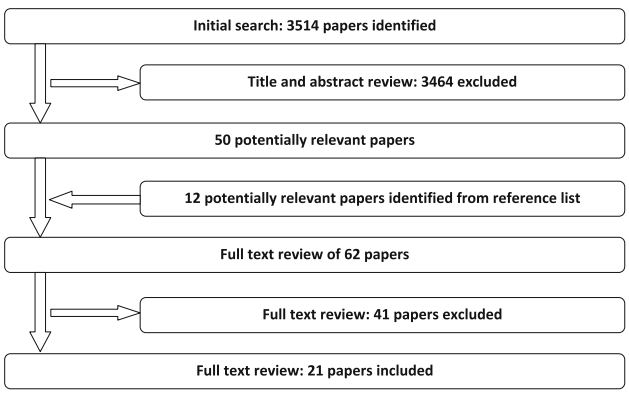

Fig. 1 Flow of papers

Time of recruitment

Details regarding time of recruitment are poorly reported in many of the studies. Some studies included a broad statement such as post-surgery without providing specific details. Two studies included patients on active treatment [1, 21]. Two studies only recruited women who had a mastectomy [12, 25] remaining studies did not specify type of surgery. Four studies use the term 'survivor' [13, 18, 35, 40], but the term is poorly defined. Only two studies [20, 39] specify a time-frame in their inclusion criteria.

Methodological quality

Three studies were RCTs with no methodological concerns (quality grading 1). A further 11 studies were RCTs with methodological concerns (grade 2). Quality scores for each study are presented in Table 2. 15 of the studies included were randomised trials [1, 6, 7, 10, 12, 18, 20, 25, 27, 35, 38–40, 43, 44] two of these did not include a control arm. Six trials were non-randomised; four of these studies just had one intervention group with no comparison [13, 16, 21, 26]. Five studies included 20 or fewer participants [6, 12, 13, 16, 26] and six of the studies included over 100 consented participants [1, 7, 20, 27, 36, 40]. Only one study [10] presented an adequate sample size calculation.

PRO questionnaires

A wide variety of PRO questionnaires were used (Table 3). The questionnaires were of varying quality; some were well-validated whereas others were designed specifically for the study. Questionnaires identified were mixed in terms of content, some focused specifically on sexual issues whilst others were broad QOL questionnaires. The number of items included in the questionnaires ranged from 8 to 132 and the number of items covering sexual issues ranged from 1 to 50.

Interventions

Interventions identified can be broadly categorised into three groups: Psycho-educational ($n = 17$), medical ($n = 2$) and exercise ($n = 2$). The components of the psycho-educational interventions have been sub-categorised for clarity and comparison purposes [23] as presented in Table 2. Not all categories are mutually exclusive. Some studies used a combination of interventions. Most of the interventions offered a series of sessions (3–16), one intervention consisted of a single session [36]. Most

Table 2 Characteristics of included studies

Author (year)	Sample (consented)	Stage of disease	Intervention	Intervention sessions	Timing of intervention	Delivery of intervention	SF outcome measures	Trial design	Quality grading	Intervention effect
Medical										
Biglia [9]	31	Not specified	Oestrogen treatment	Twice a week for 12 weeks	Post-treatment	Individual	Vaginal symptoms score and profile of female sexual function	Three-armed non-randomised control	6	Positive
Buijs [10]	60	Early or advanced	Venlafaxine or clonidine treatment	8 week treatment of one drug, break, 8 week treatment other drug	Not specified	Individual	Sexual activity questionnaire (SAQ), adverse events questionnaire	Randomised crossover, no control	3	Positive for sexual interest, none for SAQ
Exercise										
Speck [40]	295	Survivors	Exercise, weight lifting	Twice weekly (90 min) supervised sessions for 13 weeks, unsupervised sessions for up to a year	Not specified	Group	Body image and relationships scale (contains appearance and sexuality subscale)	Two-armed RCT	1	None
Berglund [7]	199	Early	Physical training, information and coping training	11 (2 h) sessions	Within two months after finishing post-op treatment	Group	Physical strength and activities questionnaire	Two-armed RCT	2	None
Counselling										
Marcus [27]	304	Early	Telephone counselling	16 (45 min) sessions over 12 months	Just completed definitive treatment	Individual	The sexual dysfunction scale	Two-armed RCT	2	Positive
Salonen [36]	250	Early	Telephone counselling	Single contact	Newly diagnosed 1 week post-surgery	Individual	EORTC BR23[a]	Two-armed non-randomised control	6	Positive clinically

Table 2 continued

Author (year)	Sample (consented)	Stage of disease	Intervention	Intervention sessions	Timing of intervention	Delivery of intervention	SF outcome measures	Trial design	Quality grading	Intervention effect
Schover [38]	60	Early	Peer counselling	3 (60–90 min) sessions	At least 1 year post-diagnosis	Individual	The female sexual function inventory, dyadic adjustment scale for women in relationships or for women who were single, the five-item dating subscale of the CARES[a]	Two-armed RCT	2	None
Ganz [18]	76	Survivors	Comprehensive Menopausal Assessment (CMA) followed by individualised care plan (including education, counselling, specific pharmacological/ behavioural interventions	3 in person sessions, initial session 45–90 min	8 months–5 years post-diagnosis	Individual	CARES[a] Menopausal Symptom Scale	Two-armed RCT	2	Positive
Scott [39]	94 (57 Breast)	Early Breast and Gynae	Educational material, coping skills, supportive counselling, communication skills, sexual counselling (CanCOPE)	5 (2 h) sessions and 1 (30 min) phone calls	Pre-surgery, post-surgery, 1 week later, 5 weeks post-surgery, 6 month follow-up. Calls 1 and 3 months post-surgery	Couple	Sexual self-schema scale and brief index of sexual functioning	Three-armed RCT	2	Positive
Skills-based										
Baucom [6]	14	Early	Couple communication techniques	6 bi-weekly (75 min) sessions	Recently diagnosed	Couple	Derogatis inventory of sexual functioning	Two-armed RCT	2	Positive (effect size)
Manne [26]	16	Early	Intimacy-enhancing behaviours, communication skills	5 (60 min) weekly sessions		Couple	Personal assessment of intimacy in relationships inventory	One intervention group	7	Positive
Christensen [12]	20	Early	Communication and problem-solving techniques	4 weekly sessions	2-3 month post-surgery	Couple	Sexual satisfaction scale	Two-armed RCT	2	Positive

Table 2 continued

Author (year)	Sample (consented)	Stage of disease	Intervention	Intervention sessions	Timing of intervention	Delivery of intervention	SF outcome measures	Trial design	Quality grading	Intervention effect
Allen [1]	164	Early	Problem-solving therapy	6 sessions; 2 2-h in person sessions and 4 telephone sessions	Just starting first course of chemo then at 2 week intervals	Individual	CARES[a]	Two-armed RCT	1	Positive (not statistically significant)
Gumus [21]	30	Early	Emotional support-focused nursing intervention	7 (90 min) weekly sessions	Within first treatment process for BrCa	Individual	Psychosocial adjustment to illness scale—self report	One intervention group	7	Positive
Scott [39]	94 (57 Breast)	Early Breast and Gynae	Educational material, coping skills, supportive counselling, communication skills, sexual counselling (CanCOPE)	5 (2 h) sessions and 1 (30 min) phone calls	Pre-surgery, post-surgery, 1 week later, 5 weeks post-surgery, 6 month follow-up. Calls 1 and 3 months post-surgery	Couple	Sexual self-schema scale and Brief index of sexual functioning	Three-armed RCT	2	Positive
Kalaitzi [25]	40	Early	Communication and sex therapy	6 bi-weekly sessions	First session in hospital when wound is revealed then bi-weekly	Couple	A questionnaire assessing sexuality and body image	Two-armed RCT	2	Positive for some variables
Rowland [35]	72	Survivors	Education, communication skills, sex therapy	6 weekly (2 h) sessions	1–5 years post-diagnosis, completed treatment	Individual	CARES[a], 8 likert items designed for the study, revised dyadic adjustment scale	Two-armed RCT	2	Positive
Berglund [7]	199	Early	Physical training, information and coping training	11 (2 h) sessions	Within two months after finishing post-op treatment	Group	Physical strength and activities questionnaire	Two-armed RCT	2	None

Table 2 continued

Author (year)	Sample (consented)	Stage of disease	Intervention	Intervention sessions	Timing of intervention	Delivery of intervention	SF outcome measures	Trial design	Quality grading	Intervention effect
Information provision										
Ganz [18]	76	Survivors	Comprehensive menopausal assessment (CMA) followed by individualised care plan (including education, counselling, specific pharmacological/ behavioural interventions	3 in person sessions, initial session 45–90 min	8 months–5 years post-diagnosis	Individual	CARES[a] menopausal symptom scale	Two-armed RCT	2	Positive
Scott [39]	94 (57 Breast)	Early Breast and Gynae	Educational material, coping skills, supportive counselling, communication skills, sexual counselling (CanCOPE)	5 (2 h) sessions and 1 (30 min) phone calls	Pre-surgery, post-surgery, 1 week later, 5 weeks post-surgery, 6 month follow-up. Calls 1 and 3 months post-surgery	Couple	Sexual self-schema scale and brief index of sexual functioning	Three-armed RCT	2	Positive
Berglund [7]	199	Early	Physical training, information and coping training	11 (2 h) sessions	Within two months after finishing post-op treatment	Group	Physical strength and activities questionnaire	Two-armed RCT	2	None
Rowland [35]	72	Survivors	Education, communication skills, sex therapy	6 weekly (2 h) sessions	1-5 years post-diagnosis, completed treatment	Individual	CARES[a], 8 likert items designed for the study, revised dyadic adjustment scale	Two-armed RCT	2	Positive
Therapy										
Vos [43]	87	Early	Existential-based psychotherapy	12 weekly (2.5 h sessions) followed by 2 additional sessions at 1 and 2 months intervals	Had surgery up to 3 months ago	Group	Sexual subscale of the EORTC BR23[a]	Three-armed RCT	2	None

Table 2 continued

Author (year)	Sample (consented)	Stage of disease	Intervention	Intervention sessions	Timing of intervention	Delivery of intervention	SF outcome measures	Trial design	Quality grading	Intervention effect
Vos [44]	87	Early	Existential-based psychotherapy	12 weekly (2.5 h sessions) followed by 2 additional sessions at 1 and 2 months intervals	Had surgery up to 3 months ago	Group	Sexual subscale of the EORTC BR23[a]	Randomised two-armed study, no control	2	None
Greer [20]	174 (82 Breast)	Any cancer, primary or first recurrence	Psychological therapy	6 weekly (1 h) sessions, including spouse where appropriate	4-12 weeks after primary diagnosis or first recurrence of cancer	Individual	The psychosocial adjustment to illness scale	Two-armed RCT	1	No significant difference for sexual relationships
Fobair [16]	20	Early	Supportive expressive group therapy	12 (90 min) meetings	Completion of initial surgical treatment	Group	Body image and sexuality scale for women with breast cancer	One intervention group	7	None
Kalaitzi [25]	40	Early	Communication and sex therapy	6 bi-weekly sessions	1st session in hospital when wound is revealed then bi-weekly	Couple	A questionnaire assessing sexuality and body image	Two-armed RCT	2	Positive for some variables
Rowland [35]	72	Survivors	Education, communication skills, sex therapy	6 weekly (2 h) sessions	1-5 years post-diagnosis, completed treatment	Individual	CARES[a], 8 likert items designed for the study, revised dyadic adjustment scale	Two-armed RCT	2	Positive
Hypnosis										
Elkins [13]	16	Survivors	Hypnosis	4 weekly (45 min) sessions	Not specified	Individual	Hot flash related daily interference scale—one question on sexuality	One intervention group	7	Positive

[a] Cancer Rehabilitation Evaluation System (CARES), European Organisation for Research and Treatment for Cancer Breast Cancer Module (EORTC BR23), Sexual Activity Questionnaire (SAQ)

Table 3 Patient reported outcome questionnaires used

Questionnaire name	Identified studies using the questionnaire	Focus of questionnaire	Is it validated?	Validation details	Number of items	Number of sex items
A questionnaire assessing sexuality and body image	Kalaitzi [25]	Sex and body image	Study-specific	Convergent validity, good internal consistency	9	6
Adverse events questionnaire	Buijs [10]	Side effects of treatment	Study-specific	–	23	1
Body image and relationships scale	Speck [40]	Attitudes about various issues following treatment	Validated	Reliability and internal consistency	32	3
Body image and sexuality scale for women with breast cancer	Fobair [16]	Sex and body image	Not validated	–	17	12
Brief index of sexual functioning	Scott [39]	Sex	Validated	Good internal reliability and discriminant validity, moderate test–retest reliability	22	22
Cancer rehabilitation evaluation system	Schover [38], Ganz [18], Allen [1], Rowland [35]	Rehabilitation and QOL of people with cancer	Validated	Reliable, valid, extensive normative data, acceptable to patients, good internal consistency	93–132	8
Derogatis inventory of sexual functioning	Baucom [6]	Sexual functioning	Validated	Internal reliability, test–retest reliability, discriminant validity	25	25
EORTC-BR23	Salonen [36], Vos [43, 44]	Breast cancer specific QOL	Validated	Clinical and cross-cultural validity, discriminant validity	53	3
Female sexual function inventory	Schover [38]	Sex	Validated	Internal reliability, construct validity, divergent validity	19	19
Hot flash related daily interference scale	Elkins [13]	Impact of hot flashes on QOL and 9 specific activities	Validated	Internal consistency and validity	10	1
Menopausal symptom scale	Ganz [18]	Menopausal symptoms	Study-specific	Good internal reliability	7	3
Likert items designed for the study	Rowland [35]	Sex	Study-specific	No details	8	8
Personal assessment of intimacy and relationships inventory	Manne [26]	Five types of intimacy	Not validated	–	36	–
Physical strength and activities questionnaire	Berglund [7]	Symptoms and functional issues	Not validated	–	21	1
Profile of female sexual function	Biglia [9]	Sexual functioning and sexual self-image	Validated	Excellent discriminant validity, good test–retest reliability and internal-consistency reliability	37	37
Questionnaire on adverse events		Known side effects of drugs	Not validated	–	23	1
Sexual activity questionnaire	Buijs [10]	Sex	Validated	Good internal consistency, construct validity, good test–retest reliability, discriminant validity	14	14
Sexual satisfaction scale	Christensen [12]	Sex and body image	Study-specific	No details	–	–
Sexual self-schema scale	Scott [39]	Women's views about sexual aspects about themselves	Validated	Good internal reliability and discriminant validity,	50	50

Table 3 continued

Questionnaire name	Identified studies using the questionnaire	Focus of questionnaire	Is it validated?	Validation details	Number of items	Number of sex items
The revised dyadic adjustment scale	Schover [38], Rowland [35]	Dyadic adjustment	Validated	Content, criterion-related and construct validity	14	1
The psychosocial adjustment to illness scale	Gumus [21], Greer [20]	Psychosocial adjustment	Validated	Good internal consistency	46	6
The sexual dysfunction scale	Marcus [27]	Sex and body image	Not validated	Good internal reliability	25	16
Vaginal symptoms score	Biglia [9]	Vaginal symptoms	Not validated	–	–	–

Study-specific indicates a questionnaire that has been designed specifically for use in the study and has not previously been validated

interventions were delivered face to face; two were delivered over the telephone [27, 36].

Medical interventions

Two studies explored medical interventions for hot flashes including oestrogens, antidepressants or antihypertension drugs [9, 10]. Both studies report positive results. Biglia's [9] study reports an improvement in sexual function for both oestrogen treatments compared to baseline figures with no improvement in the control group who received the vaginal moisturiser. All results were statistically significant ($P < .03$). Participants in Buijs' [10] study reported improvement in sexual interest compared to baseline after 2 weeks of venlafaxine treatment as recorded on the adverse events questionnaire. They did not find any effects according to the Sexual Activity Questionnaire [42] which also encompasses questions relating to sexual interest. In the Ganz [18] study (see Table 2: counselling), pharmacological interventions were offered to patients if they were experiencing problems with hot flashes, vaginal dryness or stress urinary incontinence. A nurse assessed patients' problems and determined whether they would benefit from pharmacological treatments. Ganz reported better sexual functioning in the intervention group compared to the control group in all eight items of the Cancer Rehabilitation Evaluation System (CARES) [37] sexual summary subscale.

Exercise interventions

Two RCTs explored the effects of exercise interventions [7, 40]. One study explored the impact of weight lifting on body image and related subscales in patients with and without lymphedema. The intervention in the second study [7] was a physical exercise program designed to improve mobility, muscle strength and general fitness. An aim of the intervention was to increase levels of physical and everyday activities, including sexual functioning. Neither study reported positive effects on sexual functioning.

Counselling

Five studies included a counselling element. For three studies, counselling was the main intervention [27, 36, 38]. Marcus [27] conducted a large RCT testing a telephone counselling service for breast cancer survivors which aimed to improve participants' psychosocial outcomes. Salonen [36] conducted a quasi-experimental study to explore the effect of a telephone intervention on QOL. Marcus' [27] intervention consisted of 16 telephone prescheduled counselling sessions over a period of 12 months whereas Salonen's [36] intervention was a single phone call. The third study [38] evaluated a peer counselling program aiming to improve sexual function and decrease menopausal symptoms. Salonen [36] and Schover's [38] studies did not find significant results. Salonen [36] reports a small clinical difference. Marcus [27] presents significant findings: significant improvement in the intervention group at 12 and 18 month follow-ups compared with no improvement in the control group and significant group differences in changes overtime.

Two further studies included a counselling element as part of a more complex intervention. In Ganz's [18] study, participants experiencing psychosocial problems were referred for counselling. The intervention in Scott's [39] study included supportive and sexual counselling. Supportive counselling was delivered to individual patients and sexual counselling was delivered to couples. Supportive counselling aimed to help patients deal with diagnosis and treatment and improve self-confidence and body image. Sexual counselling involved encouraging couples to discuss their ideals for a mutually satisfying sex life. Problems were identified and management strategies were suggested.

Ganz [18] reported better sexual functioning in the intervention group compared to the control group. Scott's [39] study found some significant results and attempts were made to identify which components caused the effect. The three-armed trial compared: medical information education (MI), patient coping training (PC) and couple-coping training (CanCOPE). Patients in the PC arm received supportive counselling and patients in the CanCOPE arm received sexual counselling. Participants in the PC and CanCOPE arms showed significant improvement in their views about sexual aspects of themselves and significantly less decrease in sexual intimacy compared with the MI group. No improvements in sexual dysfunction were reported but the authors argue the intervention may be more effective in women experiencing a greater number of sexual problems.

Skills-based training

In five studies, skills-based training was the main focus of the intervention. Interventions included: education, coping skills, problem-solving and communication techniques. Interventions tended to be couple-focused and treat the patient and their partner. Baucom's [6] study pilot tested a couple-based relationship enhancement-intervention which used a cognitive-behavioural approach to improve couple communication about medical issues, sexuality and body image. Manne's [26] study was also couple-focused and described the intervention as intimacy-enhancing couples therapy. The intervention aimed to improve couple communication skills by encouraging discussion of concerns and encouraging them to consider each other's feelings and changed priorities since diagnosis. Christensen's [12] intervention combined communication and problem-solving techniques to reduce levels of psychosocial discomfort. Allen's [1] study was not strictly a couple-focused intervention. A primary support person (not necessarily the spouse) was invited to participate in the study if they wished, however, this was not part of the inclusion criteria. The intervention explores the efficacy of problem-solving therapy sessions. Gumus' [21] emotional support-focused nursing intervention aimed to improve the coping skills of individual patients. Patients were encouraged to share thoughts and feelings in order to help them cope with everyday life.

Four further studies included skills-based components in their interventions. Scott's [39] study included an element of problem-solving and communication skills training and was designed to help patients develop coping mechanisms to deal with diagnosis and treatment. Kalaitzi's [25] intervention was also couple-focused and included communication training. The final two interventions including skills-based training were directed at groups of patients. One of the components of Rowland's [35] intervention was to provide communication training and Berglund's [7] intervention included a coping skills component.

Eight of the nine studies including skills-based components reported some positive effects of the intervention, three report statistically significant findings [12, 21, 25]. Scott [39] reported significant improvements in some areas (see counselling section). A large effect size demonstrated that women and their partners in Baucom's [6] intervention showed greater improvements in sexual functioning than the control group. The sample size is small ($n = 14$), however, so results should be interpreted with caution. Preliminary findings were reported for Manne's [26] study and although they report some intervention effects: increased relationship-enhancement behaviours, reduced relationship-compromising behaviours and increased relationship intimacy, the authors do not provide further information as to whether results are statistically significant. Allen's [1] study did not find any significant difference between groups in terms of sexual functioning. However, sexual function did appear to improve over time for the intervention group. Rowland [35] reported an intervention effect on the general satisfaction with sex outcome, however, no significant differences in specific sexual outcomes were reported. No positive findings in terms of sexual function were reported for Berglund's [7] intervention.

Information provision

None of the studies explored the impact of information provision exclusively. Four studies, however, did include an information component. Participants in Ganz's [18] study were given an information pack containing written materials covering symptoms and sexuality issues; they were also directed to other sources of information such as self-help books and a resource centre. Scott's [39] study provides basic medical information to patients but no psychosocial elements are addressed. Berglund's [7] intervention includes four information sessions where participants receive information related to cancer and treatment, emotional issues, diet and alternative treatments. Rowland's [35] intervention also included information provision. Three of the four interventions including an information element report some positive effects. However, it is unclear exactly what contribution information provision has made to the findings.

Therapy

Six studies included some type of therapy sessions in their interventions. Three studies explored the use of

psychotherapy. Two of the studies [43, 44] were conducted with groups of patients and one [20] was conducted with individual patients or patients and their spouse. A further study explored the use of supportive expressive group therapy [16]. None of the purely therapy-based interventions reported any significant effects on sexual functioning. Kalaitzi's [25] combination of couple and sex therapy included communication training, sensate focus and body imagery. Rowland's [35] study also included a specific sex therapy component delivered to individual patients. Both interventions including a sex therapy component reported positive findings and had a quality grading of 2.

Hypnosis

One single-arm pilot study [13] with poor quality grading explored the use of hypnosis in the treatment of hot flashes. Participants received 4 weekly 45 min hypnosis sessions aimed at reducing the frequency of hot flashes and in turn reducing the impact that hot flashes have on daily activities including sexual functioning. Patients reported statically significant improvement in decreased interference of hot flashes on sexuality.

Discussion

Twenty one studies were identified in the review. The majority of the interventions were psycho-educational reflecting the nature of sexual problems in breast cancer patients. A high proportion of the sexual problems breast cancer patients experience may be due to psychological problems rather than physiological issues. There are, however, a number of non-psycho-educational interventions [31] which could improve some of the physiological problems.

The studies included in the review presented many methodological challenges that made determining the most appropriate intervention for specific sexual problems difficult. Although all studies were conducted with breast cancer patients, the trajectory stage of patients and treatment experienced varied. Studies used a variety of different outcome measures which made comparing data difficult. The nature and target of the interventions also varied. Many of the studies identified did not define the type of sexual problems using existing criteria [5]. The interventions they explore are broad and do not address specific problems. The widespread methodological variability hinders the development of a coherent picture about what works for whom.

Fourteen studies reported some positive effects of the intervention on sexual problems, however, many of the findings were not statistically significant. Only three studies were RCTs with no methodological concerns. Five studies used non-validated questionnaires to measure sexual problems. Four studies [9, 13, 21, 26, 36] out of the six non-randomised trials reported positive effects, two of these trials, however, only included one intervention group. Many of the studies also had a small sample size: only six studies included over 100 participants.

Many of the interventions identified had a variety of components. Rowland's [35] intervention included education, communication skills and sex therapy so it is difficult to determine which part of the intervention had an effect on sexual problems. Scott's [39] study did try to tease apart some of these issues by comparing provision of medical information with supportive counselling and sexual counselling. The study did show positive effects in terms of women's sexual self-schema and intimacy but the intervention did not have an effect on sexual dysfunction.

Findings suggest some interventions or components of interventions were more effective than others. The two studies exploring medical interventions [9, 10] both reported positive effects but caution should be taken when interpreting these results due to study methodology concerns. Exercise and interventions including psychotherapy and supportive expressive group therapy do not appear to be effective in this population. The only therapy interventions that reported positive results were those where specific sex therapy was included [25, 35]. The only study including sexual counselling [39] also reported positive results. The sexual therapy and counselling interventions are based on the principles of sensate focus therapy [29].

Some interventions may be more effective at treating different types of sexual problems. Ganz's [18] study includes a nurse assessment to determine which of the target symptoms the patient is experiencing; the patient is then offered different interventions depending on the outcome of the assessment. Most studies did not screen for serious sexual problems. Screening and classification of problems may help to deliver more targeted interventions resulting in more effective treatments for patients.

Delivery of interventions also seemed to impact on effectiveness. Nine of the 11 interventions targeted at individual patients reported positive results as did all five of the couple-based interventions. None of the interventions delivered to groups of patients reported positive effects on sexual functioning. Patients may not feel comfortable openly discussing sexual issues in this environment. All the interventions delivered to couples reported some positive findings. Given the importance of the partner in sexual functioning, this result would be expected [39].

Conclusion

Tentative findings from this review suggest the most effective type of psycho-educational intervention for sexual problems experienced by breast cancer would be targeted at the patient and their partner and would include an element of sexual counselling or therapy. However, there are major methodological problems with almost all of the studies including small sample size, non-random design and use of non-validated outcome measures. More methodologically strong research is needed before any interventions can be recommended for routine practice. The timing of interventions and the effects of interventions in patients with advanced breast cancer also need to be explored. Future research should focus on providing an evidence base for clinical interventions designed to improve sexual difficulties experienced by women after cancer as without this research these difficulties will continue to be poorly assessed and managed by the clinical team [45]. Interventions should be designed to consider personal characteristics, cancer and treatment, body image, relationship with partner and health-related QOL as all these issues contribute to sexual health after breast cancer [17]. Improved screening and classification of sexual problems will ensure interventions can be more effectively targeted to suit individual patient needs.

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Conflict of interest None.

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